

REMARKS

Claims 1-19 currently remain in the application. Claims 1-3 are herein amended.

Claims 1-19 were rejected under 35 U.S.C. 112. Independent claims 1-3 have therefore been amended according to the Examiner's suggestion as provided in Paragraph 2 of the Official Letter. This amendment is believed to obviate the rejection.

Regarding the matter of joint inventors mentioned in page 3 above Paragraph 3 of the Official Letter, applicant hereby affirms that the joint inventors named in the present application were each under the obligation to assign every right regarding the base invention hereof to the assignee throughout the period of time relevant to this application.

Claims 1-9 were rejected under 35 U.S.C. 102 as anticipated by, or under 35 U.S.C. 103 as obvious over Shane. The present invention as limited by independent claims 1, 2 and 3, however, relates to a sheet of expanded graphite with a thermal conductivity in a certain specified range ($350 \text{ W}/(\text{m} \cdot \text{K})$ or more in a direction parallel to the surface), while Shane does not describe or even hint at any sheet with a thermal conductivity in an equivalent range. It is therefore believed that the sheet according to the present invention is in a technical field different from that of Shane.

Although Shane discloses a relationship between density and anisotropy (column 12, lines 1-3), furthermore, it is noteworthy that there is no description of relationship between density and thermal conductivity in Shane. Thus, as long as Shane fails to disclose any sheet having a thermal conductivity in the same range as the sheet according to claim 1 of the present application, it should be concluded that the sheet according to claim 1 of the present application is not obvious from the description of Shane.

Although there has long been a demand for expanded graphite sheets with a very high thermal conductivity (say, over $300 \text{ W}/\text{mK}$), it was not known to be possible to produce such sheets. It was under this circumstance that the present inventors successfully realized sheets with thermal conductivity over $300 \text{ W}/\text{mK}$. It should therefore be concluded that this invention is patentable.

Regarding independent claims 2 and 3, the Examiner seems to be impressed by Shane as

disclosing a graphite sheet having "a very smooth surface with a metallic luster" (Paragraph 4 on page 4 of the Official Letter). Graphite sheets, which may have a very smooth surface with a metallic luster" as macroscopically observed, mostly have small wrinkles and other types of defects. Such microscopic wrinkles and defects adversely affects the functioning of a sheet, although the sheet may appear to be very smooth and to have a metallic luster, but Shane is totally silent of any effects such wrinkles and defects may have on the functional effects of the sheet.

If powder of expanded graphite is compressed with a roller without paying any particular attention to the condition of the sheet thus produced by the compression, a sheet which macroscopically appears to have a very smooth surface with a metallic luster may be obtained but the probability of there being formed small wrinkles and defects is extremely high. Nevertheless, Shane fails to suggest any method aimed to prevent the formation of small wrinkles and defects, not to mention the possibility of such wrinkles and defects being formed at the time of the production of the sheet.

It should therefore be concluded that Shane merely discloses a sheet produced from expanded graphite powder and the description of "a very smooth surface with a metallic luster" is nothing more than that of the general appearance of the surface of a sheet of expanded graphite to a casual observer.

In summary, since Shane is totally ignoring the presence of small wrinkles and defects on the surface of the sheet, it is clearly improper to conclude that Shane was suggestive of the invention according to independent claims 2 and 3 of the present application, which were accomplished by considering the significant negative effects of wrinkles and defects on the functional property of the sheet.

It is additionally to be noted that Shane includes descriptions of embossing process (starting at column 11, line 66) on the surface of a sheet as a preferred embodiment of the invention. Shane, which recommends intentionally providing a sheet with wrinkles and defects on its surface, clearly cannot be a basis for concluding that claims 2 and 3 of the present application, the purpose of which is to reduce such wrinkles and defects as much as possible, are obvious in view thereof.

It is therefore to be concluded that independent claims 1, 2 and 3 are not obvious in view of Shane. The remaining claims, dependent from these independent claims, should therefore also be deemed non-obvious in view of Shane.

In summary, it is believed that the present Amendment is totally responsive to the Office Action and hence that the application is now in condition for allowance.

Respectfully submitted,
Weaver Austin Villeneuve & Sampson LLP
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Keiichi Nishimura
Registration No. 29,093

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500 12th Street, Suite 200
Oakland, California 94607
Telephone: (510) 663-1100
Telefax: (510) 663-0920